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Type of ANTENNARIA ALPINA, $\times 1$.

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THE NEW ENGLAND BOTANICAL CLUB

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ANTENNARIA OF ARCTIC AMERICA¹

M. O. MALTE

(Plate 281)

WHILE the *Antennariae* of Southern Canada, Newfoundland and the United States have been studied intensively and critically, particularly by Greene and Fernald, the forms of the arctic parts of the continent have so far attracted little attention. This is not surprising when it is taken into consideration that collections in the past have been largely made by casual visitors, often without any botanical training whatever. As a result, the earlier collections of arctic *Antennariae* are often very scanty, often badly collected, and frequently mixed, thus offering little attraction and generally great difficulties to the investigator studying them in herbaria. To base conclusions and new species on scanty and otherwise imperfect specimens serves really no good purpose, and the writer has therefore refrained from bothering with such material. The arctic American material investigated is that of the Gray Herbarium, Cambridge, Mass., the United States National Herbarium, Washington, D. C., the Herbarium of the New York Botanical Garden, New York, the Herbarium of the Academy of Natural Sciences, Philadelphia, Pa., as well as that of the National Herbarium of Canada, Ottawa.

¹ Published with the permission of the Director, National Museum of Canada, Department of Mines, Ottawa.

This monograph formed part of the Flora of Arctic Canada in course of preparation by Drs. M. O. Malte and C. H. Ostenfeld, an important work left unfinished by the lamentable and untimely death of Ostenfeld in 1931 and of Malte in 1933. The labels of specimens and other internal evidence indicate that the manuscript on *Antennaria* was prepared by Malte, after the death of Ostenfeld.—Eds.

DOES *A. alpina* (L.) GAERTN. OCCUR IN NORTH AMERICA?

In order to ascertain if true *A. alpina* (L.) Gaertn., as some authors maintain, really occurs in North America, and particularly in the arctic parts, where of course it is more likely to be found than in any other section of the continent, the writer has examined the Linnean specimens, lying under the name of *Gnaphalium alpinum*, in the Herbarium of the Linnean Society, London. There are two sheets, both marked in the handwriting of Linnaeus. One of the sheets, No. 70, has only the name *alpinum* inscribed on it. The other, No. 71, has in addition H. U. (Hortus Upsaliensis) and Lapp. (Lapponia). The specimens on both sheets are identical but, as No. 71 has the fullest information, it should be considered the type.

The type (PLATE 281) is a pleicephalous plant with basal rosettes borne on well developed stolons; their leaves are narrowly spatulate, mucronate, green and glabrous above, silky flocculose-tomentose and silvery-lustrous underneath. The inner bracts of the involucre are about 7 mm. long, linear-lanceolate, long-attenuate, light brown.

With the type thus precisionized it has been easy to ascertain that true *A. alpina* does not occur in North America. At least, the writer has seen no specimens matching the type.

The description of *A. alpina* given by Britton & Brown (Ill. Fl. 3. 449) clearly indicates that their *A. alpina* embraces more than one element. What Rydberg's (Fl. Rky. Mts. ed. 2: 916) *A. alpina* is, can only be determined after an examination of the specimens so labelled by him. Similarly, to speculate over what Simmons' (Phytogeography, 127) *A. alpina* is, is futile. Only an examination of the specimens cited by him, can settle the question.

Fernald asserts that typical *A. alpina* occurs in arctic America, south to Kangelaksiorvik Bay, Labrador (*Owen Bryant*), etc. The Bryant plant is *A. angustata* Greene.

A note by Greene concerning the occurrence of *A. alpina* in North America has apparently been overlooked, or else no attention has been paid to it. Greene writes (Pittonia, 3, 1898, 284) that *A. alpina* "is not known to occur on the North American continent, unless perhaps a sheet of specimens (n. 11239) in Canadian Survey collection, said to have been obtained on the Arctic sea coast by Dr. Richardson, may represent it." The specimens referred to do not belong to *A. alpina*. They belong to *A. angustata* Greene or a species closely related to it.

KEY CHARACTERS

When Greene wrote his paper, entitled "Some northern species of *Antennaria*" (Pittonia, 3, 1898, 273-289), he had at his disposal the entire collection of *Antennaria* belonging to the National Museum of Canada—then called the Museum of the Geological Survey of Canada. In this paper he divides the genus into two groups, as follows:

1. Tips of involucre bracts white or pink.
2. Tips of involucre bracts brownish or dark brown.

Fernald (RHODORA, 26, 1924, 96-97) also lays particular stress on the colour of the bracts and uses this character as one of the leading ones in his key.

When working up the Canadian arctic material, the writer found the colour character somewhat unsatisfactory. This is particularly the case in *A. pygmaea*. In this species the tips of the inner bracts vary from white to stramineous and, if the species is arranged in the key according to colour of the bracts, it may sometimes be placed in one group and sometimes in another. The writer has therefore substituted the shape of the inner bracts for the colour, and has found this arrangement working smoothly. *A. isolepis* and *A. pygmaea* then fall into one group and *A. canescens* down to and including *A. hudsonica* into another.

An important character is the presence or absence of procumbent stolons. When such are present, more or less extended mats are formed; when they are absent, the individual plants grow separately. This is an excellent character in the field. When one has to deal with scrappy and haphazardly collected specimens, such as are often found in herbaria, the character is, of course, not so good, but that in no way detracts from its inherent value. It only emphasizes the fact that *Antennarias*, to be of real value as herbarium specimens, should be collected with extreme care and that, when the collections are made, field notes indicating the mode of growth should, whenever possible, be taken.

A third set of characters, which at first did not seem very promising, has turned out to be of considerable value. These characters are monocephalism and pleiocephalism. In normally monocephalous species, such as *A. pygmaea*, *A. burwellensis*, *A. angustata*, and *A. hudsonica*, specimens are found in which more than one head occur. At first glance this fact appears to diminish the value of monocephala-

lism and pleiocephalism as key characters considerably or even nullify it altogether. But this is really not the case. The apparent pleiocephalism is in reality only pseudo-pleiocephalism. In real pleiocephalism the several heads are arranged in a corymb without any bracts subtending the branches. In the case of pseudo-pleiocephalism the supernumerary heads emerge from the axis of the uppermost stem-leaves. Their pedicels are often much more slender than the top of the stem bearing the normal head, and their heads are very often overtopping the normal one. A beautiful example of such pseudo-pleiocephalism is furnished by *A. ungavensis* (page 110) which normally is monocephalous but frequently develops an extra head from the axis of the uppermost stem-leaf. This supernumerary head is borne on a very slender, almost filiform, pedicel up to 2.5 cm. long, and is much over-topping the normal head.

SYNOPSIS OF ANTENNARIA IN ARCTIC AMERICA

- a. Basal leaves 4 cm. long or more, generally 3-nerved. . . . 1. *A. pulcherrima*.
- a. Basal leaves at most 2 cm. long, always 1-nerved. . . . b.
- b. Rosette-leaves very sparsely pubescent underneath; stem glabrous. 2. *A. nitens*.
- b. Rosette-leaves densely pubescent underneath; stem pubescent; pappus-bristles of male flowers clavellate-dilated. . . . c.
- c. Involucre 4-5 mm. high; Bering Sea species. . . . d.
- d. Monocephalous; rosette-leaves glabrous above. 3. *A. monocephala*.
- d. Pleiocephalous; rosette-leaves tomentose on both sides. 4. *A. alaskana*.
- c. Involucre about 6 mm. high or more, only female plant known. . . . e.
- e. Inner bracts of involucre obtuse or only slightly acutish. . . . f.
- f. Mature rosette-leaves densely white-tomentose on both sides; heads several, generally in an open corymbiform inflorescence. 5. *A. isolepis*.
- f. Mature rosette-leaves green, glabrous or glabrate above; heads normally solitary. 6. *A. pygmaea*.
- e. Inner bracts of involucre sharply acute to long-attenuate. . . . g.
- g. Basal rosettes borne on normally well developed, prostrate or ascending stolons. . . . h.
- h. Normally pleiocephalous. . . . i.
- i. Involucre bright green below, dark brown above. 7. *A. canescens*.
- i. Involucre inconspicuously green below, light brown above. 8. *A. arenicola*.
- h. Normally monocephalous. . . . j.
- j. Middle bracts of the involucre linear-lanceolate. 9. *A. Sornborgeri*.
- j. Middle bracts of the involucre broadly lanceolate to ovate-lanceolate. 10. *A. burwellensis*.
- g. Basal rosettes sessile or subsessile, erect or suberect. . . . k.
- k. Tomentum of the mature rosette-leaves equally dense on both surfaces; pleiocephalous. . . . l.

- l. Rosette-leaves spatulate, rounded at apex; pappus white....m.
- m. Tomentum white; inner bracts broadly lanceolate, generally abruptly contracted toward the acute apex.....11. *A. compacta*.
- m. Tomentum greyish; inner bracts linear-lanceolate, acuminate to attenuate.....12. *A. subcanescens*.
- l. Rosette-leaves narrowly oblanceolate, gradually contracted toward the acute apex; pappus sub-rufescent.....13. *A. labradorica*.
- k. Tomentum of the mature rosette-leaves in age becoming much sparser on the upper surface than on the lower, or wanting....n.
- n. Normally pleiocephalous.....14. *A. congesta*.
- n. Normally monocephalous....o.
- o. Involucral bracts generally olivaceous, the middle ones lanceolate to ovate-lanceolate, acute.....15. *A. angustata*.
- o. Involucral bracts generally light brown, the middle ones, like the innermost ones, linear to linear-lanceolate, long-attenuate....16. *A. hudsonica*.

1. *A. PULCHERRIMA* (Hook.) Greene, Pittonia, 3, 1897, 176. *A. carpathica* var. *pulcherrima* Hook., Fl. Bor.-Am. 1, 1834, 329, Macoun, Cat. Can. Pl., pt. 2, 1884, 237. *A. carpathica*, Macoun, l. c., 236, non Bluff & Fing. *A. lanata* (Hook.) Greene, Pittonia, 3, 1897, 288. *A. sp.*, Ostenfeld, Gjoa Exp. Kristiania Vid. Selsk. Skr., 1910, 67.—The whole plant white-tomentose; stem 1–5 dm. high, from a subterranean, branching caudex; radical leaves oblanceolate, acute, 4–12 cm. long, 3-nerved or, in dwarfed specimens, 1- or 2-nerved; cauline-leaves linear; heads several, in a corymb; involucre 5–7 mm. high; the outer bracts more or less dark coloured below, the inner white to umber at tip; those of the pistillate heads lanceolate to linear-lanceolate, acute to long-attenuate; those of the staminate heads elliptic, obtuse; pappus bristles of the male flowers clavate; style long-exserted, 2-cleft.—QUEBEC: No. 116,979, Richmond Gulf, east coast of Hudson Bay, *W. Spreadborough*, July 1, 1896. YUKON TERRITORY: King Point, *A. Lindström*, 1906 (Oslo).

When Greene raised Hooker's *A. carpathica* var. *lanata* to specific rank, his main reasons for doing so were that "the radical leaves in *A. lanata*, as compared with those of *A. pulcherrima* are small and nerveless (the italics are mine); the tips of its involucral bracts in the male are broad, obovate, and very obtuse, while in the female the herbaceous body of the bract is greatly narrowed and elongated, and with a narrow white tip."

All the four specimens cited by Greene are in the National Herbarium of Canada. A close examination of the largest radical leaves reveals that in one of the specimens they are 1-nerved, in another 1–3-nerved, and in the two others 3-nerved, as in *A. pulcherrima*. The only difference is that in *A. lanata* they are hidden by the tomentum but, when the latter is removed, the nerves become quite plain.

As far as the shape and colour of the involucral bracts are concerned,

the writer is unable to detect any essential difference between *A. pulcherrima* and *A. lanata*. The latter, in the writer's opinion, is merely an ecological form or at most a variety of the former.

2. *A. NITENS* Greene, *Ottawa Nat.* 25, 1912, 42.—About 1 dm. high; basal rosettes erect, sessile or subsessile; their leaves about 1 cm. long, spathulately oblanceolate, mucronate, vividly green and glabrous above, minutely and sparsely silky underneath; cauline leaves linear, glabrous, all tipped with a flat, glabrous, scarious, elliptic appendage about 2 mm. long; stem glabrous; heads solitary; involucre 6–7 mm. high, the bracts glabrous or nearly so, oblanceolate, with a dull brown, acute or acuminate, and serrulate tip. Pappus bristles strongly barbellate from below the middle to near the summit. Only the female plant known.—NORTHWEST TERRITORIES, KEEWATIN: No. 79,269. Wager Inlet, northwest coast of Hudson Bay, Lat. 65° 15' N., *J. M. Macoun*.

3. *A. MONOCEPHALA* DC., *Prodr.* 6, 1837, 269.—Dwarf, about 10 cm. high or less, often forming large mats, basal rosettes short, erect or suberect, their leaves spathulate, on the average about 10 mm. long and 3 mm. wide, mucronate, floccose-tomentose below, green and glabrous above; cauline leaves 5–6, linear, loosely lanate, their tips with a flat, scarious, glabrous, brown appendage about 2 mm. long; stem loosely lanate; heads solitary; involucre 4 mm. high, the bracts dark brown to almost black in the middle, olivaceous to golden buff at tip, inner bracts of the pistillate heads linear-lanceolate, acuminate; those of the staminate heads elliptic, obtuse or acutish; corolla of the pistillate flowers about 0.2 mm. wide, that of the staminate flowers 0.6–1 mm. wide; pappus-bristles of the male flowers clavate; style long-exserted, 2-cleft.¹—ALASKA: Cape Nome, summer, 1910, *H. E. Blaisdell* (Gray); No. 1896, Vicinity of Port Clarence, Aug. 22, 1901, *F. A. Walpole*; vicinity of Port Clarence, Aug. 12, 1901, *F. A. Walpole*.

It has been maintained by some authors that *A. monocephala* DC. occurs in Arctic Canada, Labrador, and Greenland. To settle if that really is so, the writer has endeavoured to ascertain what the true *A. monocephala* of DeCandolle is. Through the good offices of Dr. F. T. Wahlen and Dr. W. Koch, Zurich, Switzerland, the information has been secured from Dr. A. Becherer, Assistant, Conservatoire Botanique de la Ville de Genève, that in DeCandolle's herbarium there are four collections of *A. monocephala* DC. made prior to 1837, the year the species was described. Three of these are by DeChamisso, one collected in 1825 and two in 1831, and one by Fischer, collected in

¹ Description drawn from field No. 154, Glacier River, Unalaska, *Edwin C. Van Dyke*, July 21, 1907 (two male individuals), and specimens from Cape Nome, Alaska, *H. E. Blaisdell*, Summer 1900 (five female individuals). Both collections are in the Gray Herbarium.

1828, both cited as collectors of the original *A. monocephala* (DeCandolle, Prodr. 6, 1837, 269).

When seeking information about *A. monocephala* in DeCandolle's herbarium, the writer inquired if there was a specimen there which should be considered the type of the species and asked, if there was, to be supplied with a photograph of it. For reply, Dr. Becherer has kindly furnished an excellent and much appreciated photograph of the sheet holding de Chamisso's 1825 collection, made in Unalashka. This, being the first collection of *A. monocephala* DC., should therefore be considered the type.

A. monocephala DC. is entirely different from any of the *Antennariae* so far known from arctic Canada and adjacent parts of Labrador, and references to its occurrence there are due to misinterpretation of the species. A collection in the Gray Herbarium from Labrador, near Hebron, Lat. 58° 17', no date, collector Mentzel (ex herb. J. Steetz), consisting of three specimens, has a label marked "Syn. Fl. N. Amer." One of the three individuals is called *A. alpina* de Cand. var. *monocephala*. It is a monocephalous form of *A. canescens* (Lge.) Malte.

Porsild maintains (Medd. Groenl., 51, 1915, 271) that *A. monocephala* DC., considered as a synonym of *A. alpina* var. *Fricsiana* Trautv., occurs in Greenland. This is exceedingly improbable. A collection from the southern district of Egedesminde, at Giesecke's Lake, Lat. 67° 44', July 31, 1924, by A. E. Porsild, labelled *A. alpina* var. *monocephala*, is *A. angustata* Greene.

A. monocephala DC. is a Siberian and northwest North American plant, apparently common in the Aleutian Islands and extending as far north as Port Clarence, Alaska, and perhaps still farther. Forms, either identical with it or closely related, have also been collected in northern British Columbia, e. g. by Mrs. Norman Henry, 1932 (Herb. Acad. Nat. Sci., Philadelphia).

4. *A. alaskana*, n. sp. Planta nana, 3–6 cm. alta; sarmentis brevibus, erectis vel suberectis; foliis radicalibus anguste spatulatis, ad 1.6 cm. longis, ca. 3 mm. latis mucronatis, utrinque dense tomentosis; foliis caulinis paucis, ca. 3–4, linearibus, laxe lanatis, apice plano scarioso glabro 1.5–2.5 mm. longo; caule laxe lanato; capitulis 3 dense aggregatis subsessilibus; involucri ca. 4 mm. alto; squamis basin versus furvis apice subfuscis, eis capitulorum fertilium lanceolatis acutis, eis capitulorum sterilium ellipticis obtusis, corolla rosea apice purpurea; pappo florum sterilium plus minus clavato; stylo valde exserto apice profunde bifido.

Dwarf, 3–6 cm. high; basal rosettes short-peduncled, erect or

sub-erect, their leaves narrowly spathulate, up to 1.6 cm. long and about 3 mm. wide, mucronate, densely appressed-tomentose on both sides; cauline leaves 3-4, linear, loosely lanate, their tips with a flat, scarious, glabrous, brown appendage 1.5-2.5 mm. long; stem loosely lanate; heads 3, densely clustered, subsessile; involucre about 4 mm. high, the bracts dark brown at the middle, brown to golden buff at tip; inner bracts of the pistillate heads linear lanceolate, acuminate; those of the staminate heads elliptic, obtuse; corolla of the pistillate flowers about 0.2 mm. wide, that of the staminate flower about 1 mm. wide, rose-coloured below, purplish above; pappus-bristles of the male flowers slightly clavate; style long-exserted, deeply 2-cleft.—ALASKA: Near Port Clarence, field No. 1496, *F. A. Walpole*, July 20, 1901. TYPE (herb. Gray), sub nomine *A. monocephala* DC.

This species is closely related to *A. monocephala* DC. and has, like the latter, both male and female plants, whereas in all arctic American species except *A. pulcherrima*, only pistillate specimens have been observed. Like *A. monocephala*, *A. alaskana* is characterized by conspicuously small heads, a character easily separating the two from all other arctic American species of *Antennaria*.

Besides being pleiocephalous, *A. alaskana* differs from typical *A. monocephala* in having the rosette-leaves densely tomentose on both sides. In the true *A. monocephala* they are tomentose on the lower surface only.

5. *A. ISOLEPIS* Greene, Ottawa Nat. **25**, 1911, 41.—About 1-1.5 dm. high; basal rosettes well developed, procumbent, their leaves up to about 12 mm. long, oblanceolate, mucronate, tomentose on both surfaces, more densely so underneath; cauline leaves numerous, linear-lanceolate, loosely floccose-tomentose, the lowermost mucronate, the middle and upper with a narrowly elliptic, flat, scarious appendage about 2 mm. long; stem floccose-tomentose; heads several; involucre 6-7 mm. high; inner bracts with an oblong, pale brown to whitish, obtuse or slightly acutish tip. Only the female plant known.—LABRADOR: Okkak, ex. Herb. *John Ball*, 1890 (neither date nor collector; No. 83a, Port Manvers, Aug. 11, 1900, *E. B. Delabarre*; No. 421, Head of Nachvak Bay, Aug. 17, 1926, *R. H. Woodworth*; No. 155, Ramah, July 15-Aug. 20, 1894, *A. Strecker*; No. 422, Head of Ryan's Bay, Aug. 24, 1926, *R. H. Woodworth*; No. 592, Cape Harrigan, Aug. 12, 1928, *H. Bishop*; Kikkertaksoak, Saglek Bay, Aug. 10, 1931, *E. C. Abbe*. (All in Gray). Saglek Bay, Aug. 23, 1925, *R. A. Bartlett*.¹ NORTHWEST TERRITORIES, KEEWATIN: No. 79,270, Cape Eskimo, west coast of Hudson Bay, Lat. 61° 5', *J. M. Macoun*; upper Maguse River, about Lat. 62° 40', Long. 95° 10', 1932, *W. Gussow*; Kingaryuaik, Lat. 61° 50', Long. 95° 24', 1932, *W. Gussow*. MANTOBA: Long Point, Lat. 59° 21', Long. 94° 40', 1932, *W. Gussow*.

¹ The Labrador localities are all in the Torngat Region.

6. *A. PYGMAEA* Fernald, *RHODORA*, 16, 1914, 129. *A. carpathica* Gray, Syn. Fl. N. Am. 1, 1884, 232 (Labrador plant), non (Wg.) R. Br.—From 3 cm. to about 1 dm. high; basal rosettes short, erect or suberect; their leaves oblanceolate, mucronate, from 8 to about 15 mm. long, 2.5–3.5 mm. wide, glabrous or glabrate above, loosely tomentose beneath; cauline leaves linear-oblanceolate, glabrous or glabrate above, lanate beneath, tipped with a flat, glabrous, scarious, deltoid appendage 1.5–2 mm. long; heads normally solitary; involucre 6–7 mm. long, innermost bracts with an oblong, obtuse, white to stramineous tip. Only the female plant known.—LABRADOR: (ex Herb. J. Gay, *Fratres Moravici.*); Okak, *Weiz*; No. 419, Razorback Mt., Ryan's Bay, Aug. 25, 1926, *R. H. Woodworth*; No. 420, Head of Nachvak Bay, Aug. 17, 1926, *R. H. Woodworth*; No. 558, Valley of the Twin Falls, Cape Mugford Peninsula, July 17, 1931, *E. C. Abbe*; No. 559, Rowsell Harbour, July 20, 1931, *E. C. Abbe*; No. 560, "K" River, Kangalaksiorvik, Lat. 59° 18', Long. 63° 45', July 22, 1931, *E. C. Abbe*; No. 561, Base of "K-2," north side of Komaktovik, July 24, 1931, *E. C. Abbe*.¹ (All in Gray). QUEBEC: Nos. 120, 111, 120, 108, Port Burwell, Hudson Strait, July 25–28, 1928, *M. O. Malte*.

7. *A. canescens* (Lge.), n. comb. *A. alpina* (L.) Gaertn. *β. canescens* Lge. Fl. Dan., 16, fasc. xlvii, 1869, tab. 2786, fig. 1.—Plant up to 1.5 dm. high; basal rosettes borne on normally well developed, prostrate or ascending stolons; their leaves up to about 1.5 cm. long, spathulately oblanceolate, acute, densely permanently and grayishly appressed-tomentose on both sides; cauline leaves linear-lanceolate, less tomentose than those of the stolons, the middle and upper with a glabrous, scarious appendage; heads normally 3, in a dense corymb; involucre 7–10 mm. high, lanate and green below, glabrous and dark brown above; middle and inner bracts linear-lanceolate, long-attenuate; style long-exserted, 2-cleft. Only female plant known.—LABRADOR: Nos. 552 and 553, "K" River, Kangalaksiorvik, July 22, 1931, *E. C. Abbe*; No. 554, Near Island, Seven Islands Bay, Kangalaksiorvik, Aug. 6, 1931, *E. C. Abbe*; No. 556 and 556a, Razorback Harbour, Lat. 59° 14', Long. 63° 23', Aug. 17, 1931, *E. C. Abbe*; No. 414, Razorback Mt., Ryans Bay, Aug. 23, 1926, *R. H. Woodworth*; No. 413, North shore of Duck Bight, 1 km. north of Ryan's Bay, Aug. 24, 1926, *R. H. Woodworth*; Port Manvers, Aug. 11, 1910, *E. B. Delabarre*; Okkak, Aug. 1911, *F. C. Hinkley*; no locality, 1865, *Baush*; No. 74, Nain, June 28–July 30, 1928, *C. S. Sewall* (Rawson-MacMillan Subarctic Expedition, 1927–28); No. 415, Head of Main Arm of Ekortiansuk Bay, Aug. 20, 1926, *R. H. Woodworth*; near Hebron, Mentzel (ex Herb. J. Steetz); No. 411, Head of Nachvak Bay, Aug. 17, 1926, *R. H. Woodworth*; No. 412, Kikkertasak Island, Saglek Bay, Aug. 9, 1926, *R. H. Woodworth*.² QUEBEC: No. 120, 087, Port Burwell, Hudson Strait, July 25–28, 1928, *M. O. Malte*. BAFFIN ISLAND: No. 119, 192, Lake Harbour, Aug. 25–26, 1927, *M. O. Malte*.

¹ The Labrador localities are all in the Torngat Region.

² All the Labrador localities are in the Torngat region.

Dwarfed specimens growing on exposed rocks often have the stolons poorly developed and may then be taken for *A. congesta*. In the latter, however, the rosette-leaves become glabrate or glabrous above in age; the involucre is uniformly dark brown and the middle bracts broadly lanceolate to ovate, acute.

Sometimes monocephalous specimens are found. Such specimens differ from other monocephalous species as follows: from *A. nitens* in having a dense tomentum, from *A. pygmaea* in the dark-tipped, long-attenuate bracts, from *A. Sornborgeri* in the higher involucre, from *A. burwellensis* in the middle bracts which in the latter are broadly lanceolate to ovate-lanceolate, from *A. angustata* in the same character, and in the rosette-leaves which in the latter become glabrate or glabrous above when mature, and form *A. hudsonica* in the rosette-leaves which in the latter become glabrate or glabrous above in age.

8. *A. arenicola*, n. sp. Planta 1-2 dm. alta; sarmentis prostratis vel adscendentibus, usque ad 4 cm. longis; foliis eorum lineari-ob-lanceolatis, mucronatis, strigoso-tomentosis, supra tarde glabris; foliis caulinis 6-8, distantibus, linearibus, lanatis, inferioribus mucronatis, superioribus apice scarioso, glabro, anguste oblongo; caule lanato; capitulis 3 vel pluribus; involucre ca. 7 mm. alto, basi lanato; squamis mediis intimisque linearibus, longe attenuatis, parte superiore subfuscis; stylo longe exserto, profunde bifido. Planta mascula ignota.

Plant 1-2 dm. high; basal rosettes borne on well developed stolons; their leaves linear-ob-lanceolate, up to 1.5 cm. long, mucronate, dull strigose-tomentose, tardily becoming glabrous above; stem leaves 6-8, distant, linear, lanate, the lower mucronate, the upper tipped with a scarious, glabrous, narrowly oblong appendage; stem lanate; heads normally 3 or more; involucre about 7 mm. high, lanate at base; inner bracts linear, long-attenuate, light brown in the upper part; style long-exserted, deeply 2-cleft.—QUEBEC: No. 120,714 (Nat. Herb. Can.), TYPE, Sandy flat, Port Harrison, east coast of Hudson Bay, Aug. 18-20, 1928, *M. O. Malte*.

Occasionally monocephalous individuals occur. Such specimens are readily distinguished from *A. Sornborgeri* on the tomentum of the rosette-leaves which in the latter is appressed-pannose, not at all strigose, and from *A. burwellensis* on the shape of the bracts. In *A. arenicola* the inner ones are linear and long-attenuate; in *A. burwellensis* they mostly are lanceolate, acute or acuminate.

A northern Labrador species, *A. ungavensis*¹ is somewhat similar to

¹ *A. ungavensis* (Fernald), n. comb. *A. alpina* (L.) Gaertn. var. *ungavensis* Fernald, RHODORA, 18, 1916, 238.

A. arcticola in general appearance. The most conspicuous differences between the two are that in *A. arcticola* the rosette-leaves are dull strigose-tomentose below and become glabrous above very tardily, whereas in *A. unguensis* the rosette-leaves are silky tomentose below and green and glabrous above practically from the beginning. *A. unguensis* is known only from the type locality, Stillwater River, about half way between Richmond Gulf, Hudson Bay, and Ungava Bay, Hudson Strait, far to the south of the tree line.

9. *A. SORNBORGERI* Fernald, *RHODORA*, 18, 1916, 237.—Plant up to about 1 dm. high; basal rosettes on short, prostrate or ascending stolons; their leaves oblanceolate, 6–12 mm. long, 1.5–2 mm. wide, pannose-tomentose, narrowed at summit to the short-mucronate apex; cauline leaves linear, the upper with lanceolate, scarious tips; heads normally solitary; involucre 6–7 mm. high; outer bracts lanceolate, brown, the inner linear to linear-lanceolate, long-attenuate, light brown; pits of the denuded receptacle 60–100, 0.1 mm. broad, about as wide as the blunt-edged intermediate ridges. Only female plant known.—LABRADOR: No. 156, Ramah, Lat. 58° 54', Aug. 20–24, 1897, *J. D. Sornborger*.

10. *A. burwellensis*, n. sp. Planta 5–8 cm. alta; sarmentis prostratis vel adscendentibus, usque ad 3 cm. longis; foliis eorum ca. 1 cm. longis, oblanceolatis, utrinque laxe strigoso-tomentosis, mucronatis; foliis caulinis linearibus, sparse lanatis, apice plano scarioso glabro 1–2 mm. longo; caule lanato; capitulis solitariis; involucre ca. 6 mm. alto, basi lanato, fusco, parte superiore glabro, subfusco; squamis mediis late lanceolatis vel ovato-lanceolatis, acutis, intimis linearibus vel lineari-lanceolatis, acutis vel acuminatis; stylo parum exserto, bifido. Planta mascula ignota.

Plant 5–8 cm. high; basal rosettes borne on prostrate or ascending stolons up to about 3 cm. long; their leaves about 1 cm. long, oblanceolate, loosely strigose-tomentose on both sides, mucronate; cauline leaves linear, sparsely lanate, tipped with a flat, scarious, glabrous, 1–2 mm. long appendage; stem lanate; normally monocephalous; involucre about 6 mm. high, lanate and dark or greenish brown at base, glabrous and pale brown at the top; the middle bracts broadly lanceolate to ovate-lanceolate, acute, the inner ones linear-lanceolate to lanceolate, acute or acuminate; style little exserted, 2-cleft. Only female plant known.—QUEBEC: No. 120,125 (Nat. Herb. Can.), TYPE, Port Burwell, Hudson Strait, July 25–28, 1928, *M. O. Malte*.

11. *A. compacta*, n. sp. *A. candida* Macoun & Holm, Rpt. Can. Arct. Exp. 1913–18, 5, Pt. A., 1921, 21; non Greene, Leaflets 2, 151.—Planta nana, 4–5 cm. alta albo-tomentosa; sarmentis numerosis, dense aggregatis, brevibus, erectis vel suberectis, foliis eorum spathulato-oblanceolatis, utrinque satis strigoso-tomentosis; mucronatis sed mucrone tomento abdito; foliis caulinis laxe tomentosis, apice scarioso

glabro ca. 2 mm. longo, eo foliorum inferiorum lineari-lanceolato, eo foliorum superiorum oblongo; caule lanato-tomentoso; capitulis 3, dense corymbosis; involucre 6-7 mm. alto, basi lanato, atro-olivaceo; squamis interioribus apice late lanceolato, serrulato, satis abrupte acuto; stylo exserto, profunde bifido. Planta mascula ignota.

Dwarf, 4-5 cm. high, white-tomentose, basal rosettes numerous, densely crowded, short, erect or suberect; their leaves spatulately oblanceolate, densely and loosely strigose-tomentose on both surfaces, mucronate, but the mucro completely hidden by the tomentum and the leaves therefore appearing obtuse; cauline leaves loosely tomentose, the lower with linear-lanceolate appendages, the upper with oblong ones, the appendages scarious, glabrous, about 2 mm. long; stem lanate-tomentose; heads 3, crowded, short-stalked; involucre 6-7 mm. high, woolly at base, dark olive; the tips of the inner bracts broadly lanceolate, serrulate, and rather abruptly acute; style exserted, deeply 2-cleft. Only female plant known.—NORTHWEST TERRITORIES, MACKENZIE: No. 91,545, Bernard Harbour. Lat. 68° 47' N., Long. 114° 46' W., *Fritz Johansen*, July 6, 1915, TYPE (Nat. Herb. Can.; part of type also in Gray Herb.).

12. *A. subcanescens* Ostenfeld in sched., n. sp. *A. alpina* Macoun & Holm, Rpt. Can. Arct. Exp. 1913-18, 5, Pt. A, 1921, 21A, pl. xii. fig. 2, non Gaertn. Planta 5-12 mm. alta, subcano-tomentosa; sarmentis brevibus, erectis vel suberectis; foliis eorum satis late spatulato-oblanceolatis, usque ad 15 mm. longis 4 mm. latis, apice rotundatis obscure mucronulatis, mucrone tomento abdito, utrinque strigosotomentosis; foliis caulinis linearibus, apice plano, oblongo, scarioso, glabro ca. 2 mm. longo; caule sparse lanato; capitulis 3, dense corymbosis; involucre ca. 7 mm. alto, basi sparse lanato, furvo; squamis interioribus apice clariore, lineari-lanceolato, acuminato vel attenuato; stylo exserto, profunde bifido; planta mascula ignota.

Plant 5-12 cm. high, greyish-tomentose; basal rosettes short, erect or suberect; their leaves rather broadly spatulate-oblanceolate, up to 15 mm. long and 4 mm. wide, rounded and obscurely mucronulate at apex, the mucro hidden by the tomentum, strigose-tomentose on both surfaces; cauline leaves linear, tipped with flat, oblong, scarious, glabrous appendages about 2 mm. long; stem sparsely lanate; heads 3, in a dense corymb; involucre about 7 mm. high, slightly lanate and dark brown at base; tips of the inner bracts lighter, linear-lanceolate, acuminate or attenuate; style exserted, deeply 2-cleft. Only female plant known.—NORTHWEST TERRITORIES, MACKENZIE: No. 91,546, Bernard Harbour, Lat. 68° 45' N., Long. 114° 46' W., *Fritz Johansen*, Aug. 14, 1915, TYPE (Nat. Herb. Can.).

13. *A. LABRADORICA* Nutt., Trans. Am. Philo. Soc. 7, 1841, 406. *A. angustifolia* Elis. Ekman, Svensk Bot. Tidskr., 21, 1927, 53; non *A. angustifolia* Rydb., Bull. Torr. Bot. Club, 26, 1899, 546. *A. Friesiana* Elis. Ekman, Svensk Bot. Tidskr. 22, 1928, 416, as to plant discussed, not as to type, *A. alpina* var. *Friesiana* Trautv.,

Acta Hort. Petrop. 6, 1878, 24.—Plant densely caespitose, from a few cm. to about 2 dm. high; basal rosettes sessile or subsessile, erect or suberect; their leaves up to about 2 cm. long, densely and somewhat silvery strigose-tomentose on both sides, linear-ob lanceolate, mucronulate, but the mucro often hidden by the tomentum; stem and stem-leaves lanate, the latter tipped by a flat scarious, glabrous appendage 1–2 mm. long, or the lowermost mucronate; heads generally 3 in a corymb, when more then in a more open inflorescens; involucre lanate at base, about 7 mm. high; tips of the inner bracts linear to linear-lanceolate, long-attenuate, generally light chocolate brown, but sometimes more or less olivaceous; pappus subrufescent; style exerted, deeply 2-cleft. Only female plant known.—LABRADOR: No. 550, Valley of the Twin Falls, Cape Mugford Peninsula, Lat. 57° 50', Long. 61° 50', July 17, 1931, *E. C. Abbe* (Gray). BAFFIN ISLAND: No. 303, Rawson-MacMillan Subarctic Expedition, 1927–28, Fro-bisher Bay, Aug. 1927, *C. S. Sewall* (Gray); No. 52, MacMillan Expedition, 1922, Seal Harbour, July 31, 1922, *R. Robinson* (Gray); Nos. 119,194, 119,189, Pangnirtung, Cumberland Gulf, Aug. 21–22, 1927, *M. O. Malte*; No. 119,184, Arctic Bay, Admiralty Inlet, Aug. 12, 1927, *M. O. Malte*. MELVILLE ISLAND: Parry's 1st Voyage, 1819–20 (ex Herb. Mus. Brit.) (Gray). NORTHWEST TERRITORIES, KEEWATIN: No. 79,268, Wager Inlet, Hudson Bay, Lat. 65° 15', Sept. 8, 1910, *M. O. Malte*.

What *A. labradorica* Nutt. really is, has long been a mystery, and it was first in 1930, when a few fragments from Nuttall were found in the herbarium of the British Museum of Natural History, that its true identity became established. It is a strikingly distinct species, described in 1927 by Mrs. Elizabeth Ekman under the name of *A. angustifolia* (see Fernald, RHODORA, 33, 1931, 224).

Discovering that the name *A. angustifolia* was invalid on account of an earlier *A. angustifolia* Rydb., and having examined Siberian material of *A. alpina* (L.) Gaertn., var. *Friesiana* Trautv., Mrs. Ekman later came to the conclusion that her *A. angustifolia* was identical with Trautvetter's variety. She therefore adopted Trautvetter's name, at the same time raising the variety to specific rank (Sv. Bot. Tidskr. 22, 1928, 416).

A. alpina var. *Friesiana* was described from specimens collected at the Kolyma River in North Siberia by I. Augustinovitsch. Through the kindness of Dr. G. Samuelsson, Stockholm, Sweden, the writer has had an opportunity to examine a specimen of Augustinovitsch's Kolyma collection, deposited in the "Riksmuseum," Stockholm, Sweden. This specimen is not identical with *A. angustifolia* Elis. Ekman. Neither is it identical, as far as the writer has been able to

ascertain, with any other *Antennaria* so far known, from either North America or Greenland. It differs from *angustifolia* in several respects. In the first place, the tips of the inner bracts are broadly lanceolate, acute or acuminate, whereas in *angustifolia* they are linear to linear-lanceolate, long-attenuate. The basal leaves are linear, much narrower than in *angustifolia*, and with a tendency to become glabrate above in age, dull and not at all silvery as in the latter. Furthermore, they are very prominently mucronate, the mucro reaching a length of almost 1 mm.

Lately Mrs. Ekman has realized that her *A. angustifolia* is identical with Nuttall's *A. labradorica*, as is indicated by revision labels on the Stockholm material, written by Mrs. Ekman herself.

A. labradorica was much misunderstood by Greene. When describing *A. neodioica* (Pittonia, **3**, 1897, 184) he says that "there is a possibility that *A. neodioica* may be the plant intended by Nuttall as *A. Labradorica*." This is a wild guess and far from the mark and perhaps dimly realized as unwarranted by Greene himself, for he qualifies his surmise by adding that "our plant does not answer to his (Nuttall's) description."

A few months later, Greene (Pittonia, **3**, 1898, 284) made another unfortunate guess at the identity of Nuttall's *A. labradorica* when he identified it with specimens collected in 1896 by W. Spreadborough at Stillwater River, northern Labrador (now part of the Province of Quebec, Canada). These specimens No. 44,442, Nat. Herb. Can., are stoloniferous, which *A. labradorica* is not, and the broad rosette-leaves are green and glabrous above. Furthermore, they are monocephalous or falsely pleiocephalous (see page 000). The Stillwater River plant was described by Fernald (Rhodora **18**, 1916, 238) under the name of *A. alpina* var. *ungavensis* and raised by the writer to specific rank (page 110).

14. *A. congesta*, n. sp. Planta 2-8 cm. alta; sarmentis sessilibus vel subsessilibus erectis vel suberectis; foliis eorum 1-1.5 cm. longis, lineari-oblongatis, apice abrupte contractis, mucronatis, subtus laxe lanato-tomentosis, superne aetate glabrescentibus vel glabris; foliis caulinis linearibus, subtus lanatis, superne glabratis vel glabris, inferioribus mucronatis vel lineari-appendiculatis, superioribus apice scarioso, plano, glabro, oblongo, 1.5-2.5 mm. longo munitis; caule lanato; capitulis plerumque 3, densissime corymbosis; involucrio basi lanato, 7-10 mm. alto; squamis mediis lanceolatis interioribus lineari-lanceolatis, longe attenuatis, fere olivaceis apice pallidiore; stylo longe exserto, bifido. Planta mascula ignota.

Dwarf, 2-8 cm. high; basal rosettes sessile or subsessile, erect or suberect; their leaves 1-1.5 cm. long, linear-ob lanceolate, abruptly contracted towards the mucronate apex, loosely lanate-tomentose below, in age becoming glabrate or glabrous above; cauline leaves linear, lanate below, glabrate or glabrous above, the lowermost mucronate or with a linear appendage, the uppermost with a scarious, flat glabrous, oblong appendage 1.5-2.5 mm. long; stem lanate; heads generally 3, very densely congested; involucre lanate at base, 7-10 mm. high; middle bracts lanceolate, and inner ones linear-lanceolate, long-attenuate, almost olivaceous, with paler tips; style long-exserted, 2-cleft. Only female plant known.—QUEBEC: No. 120,118, TYPE; Port Burwell, Hudson Strait, July 25-28, 1928, *M. O. Malte*.

Occasionally occurring monocephalous specimens differ from *A. hudsonica* in having the rosette-leaves very abruptly contracted towards the apex and lanate-tomentose below, in the generally much shorter appendages of the uppermost cauline leaves, and in the broader middle bracts.

15. *A. ANGUSTATA* Greene, *Pittonia* 3, 1898, 284. Dwarf, 2-4 cm. high; basal rosettes sessile or subsessile; erect or suberect; their leaves about 1 cm. long, narrowly oblanceolate, mucronate, strigose-tomentose below; becoming glabrate or even glabrous above, cauline leaves linear-lanceolate, lanate below, glabrous above, the scarious, flat, glabrous, oblong appendage of the upper ones about 3 mm. long; stem lanate, heads solitary; involucre slightly lanate below, 8-9 mm. high; the lowest bracts oblong, rounded at apex, greenish to light brown; middle bracts ovate-lanceolate to lanceolate, acute, irregularly toothed; innermost bracts linear, long-attenuate, often cuspidate, much exceeding the middle ones; both middle and inner bracts dark olivaceous; style included or short-exserted. Only female plant known.—LABRADOR: Nos. 416½ and 416, Head of Ryan's Bay, Aug. 24, 1926, *R. H. Woodworth*; No. 546, Near Island, Seven Islands Bay, Kangalaksiorkvik, Lat. 59° 18', Long. 63° 40', Aug. 6, 1931, *E. C. Abbe*; No. 548, Razorback Harbour, Lat. 59° 14', Long. 63° 23', Aug. 17, 1931, *E. C. Abbe*; No. 540 and 540a, "K" River, Kangalaksiorkvik, July 22, 1931, *E. C. Abbe*; No. 542, Mt. Tetragona, July 26, 1931, *E. C. Abbe*; No. 539, Rowsell Harbour, Lat. 58° 58', Long. 63° 15', July 20, 1931, *E. C. Abbe*; Nos. 545 and 545a, Peak "19," The Four Peaks, Lat. 59° 25', Long. 63° 55', Aug. 4, 1931, *E. C. Abbe*; Nos. 541 and 541a, Summit of "K-2," Komaktorkvik, July 24, 1931, *E. C. Abbe*; Nos. 409 and 410, Nachvak Bay, Aug. 16 and 17, 1926, *R. H. Woodworth*; No. 544, Scree slide from top of Precipice Ridge to Komaktorkvik Lake, July 29, 1931, *E. C. Abbe*; No. 410⅓, Head of Main Arm of Ekortarsuk Bay, Aug. 10, 1926, *R. H. Woodworth*; Kangaksiorkvik Bay, Sept. 1-10, 1908, *Owen Bryant* (Bryant Labrador Expedition, 1908).¹ QUEBEC: No. 11,248, Cape Chudleigh, Hudson Strait, Aug.

¹ All the above localities are in the Torngat region.

5, 1884, *R. Bell*; No. 62,999, Port Burwell, Hudson Strait, July 29, 1904, *L. E. Borden*; No. 79,271, Port Burwell, Hudson Strait, July 18, 1910, *J. M. Macoun*; Nos. 120,040, 120,079, 120,171, 120,095, Port Burwell, Hudson Strait, July 25-28, 1928, *M. O. Malte*; No. 34,739, Cape Wales, Hudson Strait, about Long. 72°, no date, no collector's name; No. 23,012, opposite Digge's Island, Hudson Strait, about Long. 77°, Aug. 3, 1898, *A. R. Low*. BAFFIN ISLAND: No. 18,744, North shore of Hudson Strait, Aug. 1897, *R. Bell*; No. 119,190, Lake Harbour Aug. 25-26, 1927, *M. O. Malte*; No. 121,370, Pangnirtung Fiord, Cumberland Gulf, July 26, 1924, *J. D. Soper*; Nos. 119,187, 119,188, Pangnirtung, Cumberland Gulf, Aug. 21-22, 1927, *M. O. Malte*.

16. *A. hudsonica* n. sp. *A. glabrata* (J. Vahl) Greene, f. *tomentosa* Elis. Ekman, Sv. Bot. Tidskr, 21, 1927, 51. Planta 3-15 cm. alta; sarmentis sessilibus vel subsessilibus, erectis; foliis eorum ca. 1 cm. longis, linear-oblongeolatis, apice satis gradatim contractis, mucronatis, subtus strigoso-tomentosis, superne aetate glabrescentibus vel glabris; foliis caulinis linearibus, subtus lanatis, superne glabris vel glabris, summis apice scarioso, plano, glabro, oblongo, vel anguste deltoideo, usque ad 4 mm. longo; caule lanato; involucri basi lanato, ca. 7 mm. alto; squamis mediis interioribusque linearibus vel linearilanceolatis, longe attenuatis, apice subfusco; stylo exserto, bifido. Planta mascula ignota.

Plant 3-15 cm. high; basal rosettes sessile or subsessile, erect or suberect; their leaves about 1 cm. long, linear-oblongeolate, gradually contracted towards the mucronate apex, strigose-tomentose below, in age becoming glabrate or glabrous above; cauline leaves linear, lanate below, glabrate or glabrous above, the scarious, flat, glabrous, oblong or narrowly deltoid appendage of the uppermost one reaching a length of up to 4 mm.; stem lanate; involucre lanate at base, about 7 mm. high; middle and inner bracts linear to linear-lanceolate, long-attenuate, with light brown tips; style exserted, 2-cleft. Only female plant known.—LABRADOR: No. 417, Head of Main Arm of Ekortarsuk Bay, Aug. 20, 1926, *R. H. Woodworth*; No. 418, Razorback Mt., Ryan's Bay, Aug. 23, 1926, *R. H. Woodworth*; No. 547, East Bay, Ikordlearsuk, Lat. 59° 55', Long. 64° 24', Aug. 12, 1931, *E. C. Abbe* and *N. Odell*; No. 549, Near Island, Seven Islands Bay, Kangalaksiorvik, Aug. 6, 1931, *E. C. Abbe* (Gray). QUEBEC: Nos. 119,185 (TYPE!), 119,186, Port Burwell, Hudson Strait, Aug. 30, 1927, *M. O. Malte*; No. 120,171, Port Burwell, Hudson Strait, July 25-28, 1928, Nos. 120,975 and 120,993, Wolstenholme, Hudson Strait, Aug. 26, 1928, *M. O. Malte*; Smith Island, east coast of Hudson Bay, Aug. 24, 1928, *M. O. Malte*. BAFFIN ISLAND: Nos. 119,193, 119,191, Lake Harbour, Aug. 25-26, 1927, *M. O. Malte*; Nos. 120,332, 120,344, 120,382, Cape Dorset, Aug. 4, 1928, *M. O. Malte*. NORTHWEST TERRITORIES, KEEWATIN: No. 120,507, Chesterfield Inlet, Aug. 8-11, 1928, *M. O. Malte*.

The writer believes that this species is identical with *A. glabrata* (J. Vahl) Greene f. *tomentosa* Elis. Ekman, a Greenland plant, a specimen of which has kindly been presented by Mrs. Ekman. The name *tomentosa* as given to a form of *A. glabrata* is of course quite appropriate but when applied to a species of such a genus as *Antennaria* it certainly is not. The writer has therefore, with reluctance, when raising *A. glabrata* f. *tomentosa* to specific rank, decided to abandon Mrs. Ekman's name and select another one, a procedure against which there is no international rule. As the species is widely distributed in the Hudson Strait and Hudson Bay regions, the name *hudsonica* has been chosen.

NATIONAL MUSEUM OF CANADA

A NEW PRIMULA FROM THE GRAND CANYON OF THE COLORADO

M. L. FERNALD

(Plate 282)

WHEN I studied¹ the North American species of *Primula* § *Farinosae* in 1928, the most southern member of the section then known in North America was the very distinct and highly localized *P. specuicola* Rydb., of cliffs of the Colorado River and its tributaries in southeastern Utah. Additional specimens have subsequently come to hand, including excellent flowering material supplied through the late Dr. Rydberg, but the range of the species has not been extended outside of the Colorado River area of Utah.

Shortly after my publication on the group Mr. Francis Welles Hunnewell collected on the North Rim of the Grand Canyon of the Colorado in Coconino Co., Arizona, a plant with the leaves much as in *Primula specuicola*. This, quite naturally, was temporarily identified with the plant from farther up the River; but now, a careful checking of its characters shows the plant from the Grand Canyon to be a second localized species with which it is a great pleasure formally to associate the name of its discoverer:

PRIMULA (§ FARINOSAE) **Hunnewellii**, sp. nov. (tab. 282), planta *P. specuicolam* simulans; foliis spathulatis membranaceis subtus plus minusve farinosis 4–9 cm. longis 0.7–1.5 cm. latis sinuato-dentatis apice rotundatis; scapo filiformi glabro nitido 5.5–11.5 cm. alto;

¹ RHODORA, xxx. 59–77, 85–104 (1928).

involucris bracteis lineari-subulatis 2-4 mm. longis basi dilatatis vix gibbosis; floribus 3-10; pedicellis filiformibus adscendentibus vel arcuatis deinde 1.5-3 cm. longis; calycibus chartaceis plus minusve farinosis campanulatis 3-4 mm. longis 2-3.5 mm. diametro, lobis lanceolato-deltoides 2-2.4 mm. longis minute ciliolatis; corollae tubo gracili 5-6 mm. longo limbo ca. 7 mm. diametro purpureo (?), lobis emarginatis; capsulis cylindricis 5 mm. longis valde exsertis; seminibus angulatis 0.6-0.8 mm. longis fulvescentibus rugulosis.—ARIZONA: limestone cliffs, North Rim, Grand Canyon, Coconino Co., August 19, 1928, *Francis Welles Hunnewell*, no. 10,883 (TYPE in herb. F. W. Hunnewell, duplicate in Gray Herb.).

PRIMULA HUNNEWELLII, as already stated, is nearest related to the rare *P. specuicola* Rydb., also of the Colorado Valley. From the latter it differs most strikingly in its very small calyx, only 3-4 mm. long, and its definitely exserted capsule; *P. specuicola* having the more herbaceous calyx 6-9 mm. long (FIG. 3), with more attenuate lobes and greatly exceeding the capsule. In *P. specuicola*, likewise, the involucre is better developed, up to 1 cm. long. Whether there are any essential differences in the corolla can not yet be stated. Seeds from the type collection have been shared between Mr. Hunnewell, the Harvard Botanic Garden and the Royal Botanic Garden at Edinburgh (where is found the world's greatest collection of living *Primulas*). Should any of these germinate it will be possible later to report upon the fresh flowers. PLATE 282 from a photograph made by Professor J. Franklin Collins and presented to RHODORA by Mr. Hunnewell, shows a single plant (FIG. 1) of *P. Hunnewellii*, $\times 1$, and beside it (FIG. 2) a fruiting calyx, $\times 3$; with a fruiting calyx of *P. specuicola* Rydb. $\times 3$ (FIG. 3) for comparison, from the type locality, Bluff City, southeastern Utah, *Eastwood*, no. 68.

GLOTTIDIUM VESICARIUM IN OKLAHOMA.—Specimens of *Glottidium vesicarium* (Jacq.) Harper were brought recently to the botany department by Dr. A. C. Shead. These plants were collected by Dr. Shead near Mannsville, Johnston County, October 8, 1933, where, according to the collector, they occur very locally, and chiefly near the highway. Johnston County lies just east of the south-central part of the state. To the writer's knowledge, this location constitutes the most north-westerly one known for the species, the previously known range being considered as from the Carolinas to Florida and west to Texas.

Being annuals, these leguminous plants elicited the usual surprise

because of their woody stems and unusual height—the specimens exceeding three meters.

Whether the plants are native, and possess an intermittent range to the Gulf, or have been introduced, is still a conjectural matter.—
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NOTES ON THE FLORA OF TENNESSEE: THE GENUS TRILLIUM

W. A. ANDERSON

THE genus *Trillium*, including as it does some of the most attractive spring flowers, has always had considerable attention from botanists. More than a hundred years ago the greater number of eastern North American species had been introduced into Europe, where they were cherished as horticultural rarities. Illustrations, not only of the various species, but also of color-forms, appeared in the botanical and horticultural publications of the late 18th and early 19th centuries. As for the present day interest in *Trillium*, there have been within the past forty years four revisions of the genus or of sections of it;¹ two revisions of the *Trilliums* of particular regions;² a series of studies of the California *Trilliums*, involving the life-history of the plants, their frequent sterility, and production of monstrosities;³ and a vast number of short notices, mostly concerned with teratological forms. In spite of all this publication, several points seem to have been overlooked concerning the taxonomy and nomenclature of this interesting genus, and there are certain problems which as yet await solution.

Though the genus *Trillium* is a small one, it is unusually complex. Many species exhibit a high degree of variability in size, in color, and in form. All the species with atropurpureous petals have light-colored allies, which may be recognized as forms or varieties, or which in some

¹ Small, J. K., *The Sessile-flowered Trillia of the Southern States*, Bull. Torr. Bot. Cl. xxiv. 169–175 (1897).

Rendle, A. B., *Notes on Trillium*, Journal of Botany, xxxix. 321–335 (1901).

Gleason, H. A., *The Pedunculate Species of Trillium*, Bull. Torr. Bot. Cl. xxxiii. 387–396 (1906).

Gates, R. R., *A Systematic Study of the North American Genus Trillium*, Ann. Missouri Bot. Gard. iv. 43–92 (1917).

² Peattie, Donald C., *Trillium in North and South Carolina*, Jour. Elish. Mitch. Soc. xlii. 193–206 (1927).

Friesner, Ray C., *The Genus Trillium in Indiana*, Butler Univ. Bot. Studies, Papers nos. 2 and 3 (1929).

³ Goodspeed and Brandt, *Notes on the Californian Species of Trillium*, Univ. Calif. Pub. Bot. vol. vii, nos. 1–4 (1916–1917).

cases are given specific rank. In the group of large, broad-leaved, sessile-flowered Trilliums, the specific lines are particularly hard to draw. *Trillium Hugerii* and the plant described by Harbison as *T. luteum* are, respectively, the deep-red and greenish-yellow, sessile-flowered Trilliums of the Tennessee and North Carolina Appalachians. In the Ozarks and vicinity are *T. viride*, a green-petalled species, and a purplish-flowered variety which has been given specific rank as *T. viridescens*. These two are described as having narrower petals than does *T. Hugerii*, and as being slightly pubescent near the tops of the stems and on the veins of the leaves, but some individuals are hard to separate from the Appalachian plants. In California is a series of sessile-flowered Trilliums which is almost identical with these of the Ozarks and of the Appalachians, and which includes atropurpureous-, greenish-yellow-, and white-flowered forms, also narrow-petalled and broad-petalled plants. McBride¹ suggests the possibility that these are identical with the Appalachian species. In view of the fact that the floras of the two regions are unrelated, this seems unlikely, yet more study will be needed before the relationships of these plants is satisfactorily explained. It is small wonder that Elliott, in 1817² wrote of the genus *Trillium*, "Under great simplicity and conformity of habit, . . . it contains and conceals many species."

That field experience is desirable is an axiom of taxonomic procedure. Other lines of attack which might lead to a better understanding of the genus *Trillium* are:—

1. A study of growth in various parts of the plant during the flowering period, such as was made by Harbison³ on *T. ludovicianum*.
2. A study of rootstock- and fruit-characters. The present investigation reveals that one section of sessile-flowered Trilliums may be set apart on rootstock-characters alone. Fruits are rarely collected, and apparently little attention has been paid to them.
3. Studies in hybridization. Gates⁴ suggests hybrid origin of many strains within certain species, and Goodspeed⁵ suggests that teratological variations may result from the heterozygous condition. Experimental proof of these statements should be attempted.

¹ McBride, J. F., Contr. Gray Herb. n. ser. lvi 19 (1918).

² Elliott, Stephen, Sketch of the Botany of South Carolina and Georgia, i. 430 (1817).

³ Harbison, T. G., Biltmore Bot. Studies, i. 24 (1901).

⁴ Gates, R. R., Ann. Mo. Bot. Gard. iv. *T. erectum* var. *album*, p. 54, and *T. luteum*, p. 46.

⁵ Goodspeed, Univ. Calif. Pub. Bot. vii. 85 (1917).

Tennessee has so many species of *Trillium* within its borders that a study of them involves nearly all the species of the eastern United States. The following key includes all known species within this region excepting the southern *T. decumbens*, *T. ludovicianum*, and *T. pusillum*, and the middle-western *T. nivale*.

- a. Flowers sessile....b.
 - b. Rootstocks slender, horizontal; petals distinctly clawed; anthers arching over the stigmas....c.
 - c. Leaves petioled; sepals reflexed.....6. *T. recurvatum*.
 - c. Leaves sessile; sepals spreading.....7. *T. lanceolatum*.
 - b. Rootstocks short and stout; petals variously shaped, but, if narrowed below, not into a distinct claw; anthers straight....d.
 - d. Stamens about half the length of the petals....e.
 - e. Petals about half the width of the sepals; stamens 1.5–2 mm. broad.....9. *T. stamineum*.
 - e. Petals as wide as or wider than the sepals; stamens about 1 mm. wide.....1. *T. sessile*.
 - d. Stamens not more than one third the length of the petals....f.
 - f. Petals broadly spatulate, at least one of them mucronate.
 - 8. *T. discolor*.
 - f. Petals linear to broadly oblanceolate, usually acute or acuminate, rarely obtuse, but not spatulate....g.
 - g. Leaves lanceolate to ovate, acute.....2. *T. maculatum*.
 - g. Leaves broadly ovate to orbicular, acuminate....h.
 - h. Entirely glabrous; petals narrowly to broadly oblanceolate....i.
 - i. Petals atropurpureous.....3. *T. Hugerii*.
 - i. Petals yellow.....4. *T. luteum*.
 - h. Upper part of stem and veins on lower surfaces of leaves pubescent; petals linear.....5. *T. viride*.
- a. Flowers peduncled....j.
- j. Ovary winged or angled; petals of one color....k.
- k. Petals lanceolate to ovate, spreading from the base; ovary usually dark-colored....l.
- l. Filaments 2–3.5 mm. long....m.
- m. Petals atropurpureous.....10. *T. erectum*.
- m. Petals white.....10a. *T. erectum* var. *album*.
- l. Filaments 5–10 mm. long.....11. *T. Vaseyi*.
- k. Petals lanceolate to oblong or obovate, their bases ascending, the upper part spreading; ovary light-colored....n.
- n. Filaments and anthers slender; flowers usually raised above the leaves.....12. *T. grandiflorum*.
- n. Filaments and anthers stout; flowers on cernuous or declined peduncles, below the leaves....o.
- o. Style present; stamens usually long and anthers curved; corolla revolute.....13. *T. Catesbaei*.
- o. Style absent; stamens short and straight; corolla spreading, not revolute....p.
- p. Peduncle about as long as the flower, curved downward.....14. *T. cernuum*.
- p. Peduncle almost as long as the leaves, straight, but declined beneath the leaves.....15. *T. Gleasoni*.
- j. Ovary not winged or angled; petals white, with a purple spot near the base.....16. *T. undulatum*.

1. *TRILLIUM SESSILE* L. Sp. Pl. i. 340 (1753). *T. longiflorum* Raf.¹ Med. Fl. ii. 97 (1830). *T. rotundifolium* Raf. l. c. *T. tinctorium* Raf. l. c. 98. *T. isanthum* Raf. l. c. *T. membranaceum* Raf. l. c.—*T. sessile* grows in Pennsylvania, Virginia, Ohio, central Kentucky, Tennessee and Arkansas. In Tennessee it has been found only in the central part of the State. Kingston Springs, *Svenson*, no. 34. Nashville, *Wilkinson*; Lee's place (Nashville), Apr., 1878, *Gattinger*.

While Linnaeus included at least two species in his *Trillium sessile*, Small² and Rendle³ have shown that the name is more properly applied to this small plant of the middle States. Yellow- or green-flowered plants often are present in colonies of the ordinary red-flowered plants.⁴

2. *T. MACULATUM* Raf. Med. Flor. ii. 103 (1830). *Solanum triphyllum flore hexapetalo* Catesby, Nat. Hist. Carol. t. 50. *T. sessile* L. in part. *T. sessile* Elliott, Sketch i. 426 (1817), as to plant described. *T. discolor* Chapman, Fl. Southern U. S. 478 (1860) and later editions, not Wray. *T. Underwoodii* Small, Bull. Torr. Bot. Cl. xxiv. 172 (1897) and in Fl. Se. U. S. 277 (1903). *T. lanceolatum* Boykin, var. *rectistamineum* Gates, Ann. Mo. Bot. Gard. iv. 48 (1917). *T. rectistamineum* (Gates) St. John, RHODORA xxii. 78 (1920). Perhaps *T. sessile*, var. *praecox* Nuttall, Trans. Am. Phil. Soc. v. 154 (1837).—Rhizome usually corm-like, erect or horizontal; stem 1–3.5 dm. high, smooth; leaves 6–11 cm. long, lance-ovate, with rounded base and acute tip, strongly mottled, mottling tending to form longitudinal stripes; sepals 2.5–5 cm. long, erect, lanceolate, acute; petals 3.5–6 cm. long, oblanceolate, acute; anthers about 13 mm. long, connective projecting; stigmas recurved.

Though this plant has been known as long, perhaps, as any species of *Trillium*, and was one of the first to be illustrated, it has been the subject of a great deal of misunderstanding. Even after Small clearly demonstrated its validity as a species and gave it a name,

¹ Many of the numerous species of *Trillium* proposed by Rafinesque are referable to the trivial variations which are so abundant in this genus. A number of them can be identified with well marked species, and where this is the case they are cited in synonymy in this paper.

² Small, J. K., *Sessile-flowered Trillia of the Southern States*, Bull. Torr. Bot. Cl. xxiv. 169 (1897).

³ Rendle, A. B., *Notes on Trillium*, Jour. Bot. xxxix. 321 (1901).

⁴ Peattie, Jour. Elish. Mitch. Soc. xlii. 197 (1927), considers *T. sessile*, var. *luteum* Muhl. to be one of these rather than the larger *T. luteum* (Muhl.) Harbison of North Carolina and eastern Tennessee. Harbison, however, makes it clear, from his study of plants in the Muhlenberg herbarium, that the name is properly applied to the more southern plant, and he published it properly in Biltmore Botanical Studies i. 22 (1901). Beyer, in Torreya xxvii. 83 (1927), publishes *T. sessile*, var. *viridiflorum*, a green-flowered form of *T. sessile*. That such forms have long been recognized is shown by the fact that in every edition of Gray's Manual except the first, the petals of *T. sessile* are described as "purple varying to greenish."

Gates described it as a variety of *T. lanceolatum*, which it only superficially resembles, and St. John raised it to specific rank under Gates' varietal name.

Among the numerous species of *Trillium* described by Rafinesque, this one is unmistakable, not so much by the description, as by the citation to Elliott. Rafinesque's description is as follows:

34. *Tr. maculatum* Raf. (*Tr. sessile*, Elliot.) Stem spotted, leaves sessile ovate acute, trinerve, spotted: calyx erect oblong, petals spatulate, twice as long, dark purple. In Carolina, &c.

Elliott's Latin diagnosis is a direct quotation from Pursh: "*T. flore sessili, erecto; petalis lanceolatis, erectis, calyce duplo longioribus; foliis sessilibus, lato-ovalibus, acutis. Pursh, 1. p. 244.*" This might apply to any one of several sessile-flowered *Trilliums*, but Elliott's careful supplementary description leaves no doubt as to the plant involved:

Root thick, solid, with rings on the circumference, which, perhaps, indicate each years growth. Stem herbaceous, 6–12 inches high, glabrous, spotted, with small decaying sheaths at base. Leaves 3 at the summit of the stem, ovate, or oval, acute, 5 nerved, the 2 exterior obsolete, curiously spotted. Flowers sessile on the summit of the stem. Calyx 3 leaved, leaves oblong, ovate, erect, glabrous, green. Petals spatulate, lanceolate, erect or connivent, twice as long as the calyx, dark purple. Filaments flat, rigid, not half as long as the calyx, dark purple. Anthers linear, attached to the sides of the filaments, pale purple. Germ superior, ovate, 3 angled. Styles short, expanding. Stigma obtuse. Berry glabrous, depressed, dark purple.

Grows in rich, high lands. The only species found near the sea coast. Flowers March–April.

It is clear that by "filaments" Elliott meant both filaments and connective, and that the stamens were only one fourth as long as the petals. This is the diagnostic character which sets off *T. maculatum* and *T. Hugerii* from *T. sessile*. That Elliott's plant was not *T. Hugerii* is indicated by the fact that the leaves were "ovate, or oval, acute, . . . curiously spotted." *T. Hugerii* has broadly ovate, acuminate leaves which are not strikingly spotted. In addition to this Elliott gives the correct geographic data,—“the only species found near the sea coast.”

There are no authentic records of *Trillium maculatum* in Tennessee. It is a plant of the coastal plain and piedmont regions from the Carolinas to Alabama and Mississippi.

3. *TRILLIUM HUGERII* Small, Fl. Se. U. S. 277 (1903).—A plant of the Appalachians of the Carolinas and Tennessee, which may be dis-

tinguished from *T. maculatum* by its broader, less mottled leaves, but is less readily separable from *T. viride* of the Ozark region, and perhaps should be included in that species. Knoxville, *Scribner*, no 7553; Lookout Mountain, Apr. 29, 1906, *T. O. Fuller*; wet ravine near Emory River, Wartburg, May 22, 1929, *Jennison & Anderson* (this specimen had petals pale toward the tips like *T. viride*, but is glabrous); Nashville, *Wilkinson*, and in Apr., 1878, *Gattinger*.

4. *T. LUTEUM* (Muhl.) Harbison, Biltmore Bot. Studies. i. 22 (1901). According to Harbison, *T. sessile*, var. *luteum* Muhl. Cat. p. 38 (1813). *T. Underwoodii*, var. *luteum* McBride, Contr. Gray Herb. lvi. 19 (1918). *T. luteum*, var. *latipetalum* Gates, Ann. Mo. Bot. Gard. iv. 46 (1917). *T. Hugerii*, forma *flava* Peattie, Jour. Elish. Mitch. Soc. xlii. 199 (1927).—Stem 2–6 dm. high from a short, thick rootstock; leaves 6–14 cm. long, broadly ovate to orbicular, acuminate, mottled, smooth, or veins of lower surface scabrous; sepals 3–4 cm. long, lanceolate, blunt; petals 4–6 cm. long, narrowly to broadly oblanceolate, sometimes almost linear, often somewhat twisted toward the tips, greenish-yellow to almost a buttercup-yellow; stamens 1–1.5 cm. long, filaments very short, connectives broad and slightly projecting at the tip; flower delicately fragrant, lemon-scented.

This plant is the most abundant *Trillium* in the valley of East Tennessee where it grows in pure stands unmixed with any red-flowered form. It does, however, show considerable range of variability, and the extreme types approach other named "species" so closely that it becomes doubtful whether the distinction really exists or not. *T. luteum* is closest related to *T. Hugerii*, to which it is similar in every respect except in color; every part of the plant shows the yellow pigmentation instead of purple. A specimen with wide petals would fall under Gates' var. *latipetalum*. One with very narrow, greenish petals, if accompanied with scabrous veins on the leaves would pass for *T. viride*, and forms with twisted petals approach *T. decumbens* Harbison, at least in this respect.

McBride described *T. luteum* as a variety of *T. Underwoodii* because he confused that species with *T. Hugerii*. Through the courtesy of Dr. J. K. Small the writer has been able to examine type material of *T. Hugerii* and representative specimens of *T. Underwoodii*. There can be no doubt that *T. luteum* is more properly associated with the former species.

Near Wolf Creek, May 19, 1928, *Jennison*; Sevierville, Apr. 11, 1917, *Ainslie*; Love's Creek, Knox County, Apr. 1925, *Galyon*; Knoxville, rich soil, common, May, 1895, *Ruth*; foot of Clinch Mountain, Corryton, *Marjorie Shipe*, no. 1; Harriman, *Kearney*, no. 107; Grand View, 1897, *R. W. Taylor*. A specimen of *Gattinger's*, from

Nashville, Apr. 1878, which is labelled *T. sessile*, var. *discolor* may belong to this species, though it is very faded, and could equally well be *T. Hugerii* or *T. viride*.

5. *T. VIRIDE* Beck, Amer. Jour. Sci. ix. 178 (1826). *T. viridescens* Nuttall, Trans. Am. Phil. Soc. v. 155 (1837). *T. sessile*, var. *Nuttallii* Watson, Proc. Am. Acad. Sci. xiv. 273 (1879).

As represented by specimens in the Gray Herbarium, plants from Missouri and Arkansas have stamens which are actually and proportionally longer than those of narrow-petalled specimens of *T. Hugerii* from Tennessee. The original description of *T. viride* states that the stamens are "half the length of the corol," but in specimens the writer has seen they are nearer one third. Most specimens of *Trillium* are mounted in such a way that the upper parts of the stems and the undersides of the leaves can not be seen. *T. viride* is described as being pubescent on these parts, but a study of fresh or unmounted specimens will be necessary in order to ascertain the constancy of this character. Small¹ recognizes *T. viridescens* as a separate species, with solidly purple-red petals.

T. viride grows in Missouri and Arkansas, and according to Small, in North Carolina, Alabama and Mississippi. A specimen of *Gattinger's*, Nashville Apr., 1878, and one of *Scribner's*, Knoxville, May 18, 1889, may belong to this species.

6. *T. RECURVATUM* Beck, Am. Jour. Sci. xi. 178 (1828). *T. unguiculatum* Raf. Med. Bot. ii. 98 (1830). *T. unguiculatum* Nutt. Trans. Am. Phil. Soc. v. 154 (1837).—1.3–3 dm. high from a slender horizontal rootstock; leaves 6–9 cm. long, narrowed into a petiole which is 0.8–2 cm. long, blade broadly lanceolate to nearly orbicular; sepals 1.5–2.2 cm. long, lanceolate, reflexed so they lie close against the stem; petals 2.2–3.2 cm. long, erect, clawed; blade varying in width but usually lanceolate and acuminate; filaments 3–4 mm. long, anthers 6–10 mm. long, incurved at the tip; stigmas erect with curved tips.²

As in other species of *Trillium* there is great variation in the shape of the petals. In southeastern Iowa a robust form with broad, scarcely clawed petals and nearly sessile leaves is very common. It would pass for a distinct variety or almost as a separate species, if it did not intergrade with typical plants in the same colony. A yellow form, *T. recurvatum*, forma *luteum* has been described by Clute³ and also by Friesner.⁴

¹ Small, Fl. Se. U. S., 278 (1903).

² Robertson, Charles, Bot. Gaz. xxi. 271 (1896), says this arrangement of stigmas and stamens is for self pollination, that these flowers have lost their power to attract insects other than occasional beetles which feed on the pollen.

³ Clute, Willard N., Am. Botanist xxviii. 79 (1922).

⁴ Friesner, Ray C., Butler Univ. Bot. Studies, Paper 3: 29 (1929).

T. recurvatum is a species of the Mississippi valley from Michigan and Wisconsin southward to West Tennessee and Arkansas. Low woods in river bottom, Clarksville, Apr. 23, 1919, *Ainslie*; rich woods, Bain, no. 174; Jackson, Apr. 1893, *Bain*; Brighton, Tipton county, *Palmer*, no. 17317.

7. *T. LANCEOLATUM* Boykin ex Watson, Proc. Am. Acad. xiv. 274 as syn. (1879); Small, Bull. Torr. Bot. Cl. xxiv. 174 (1897). *T. recurvatum* var. *lanceolatum* Wats. Proc. Am. Acad. Sci. xiv. 273 (1879).—Differs from *T. recurvatum* in having lanceolate, sessile leaves; sepals spreading, not reflexed; plant taller and more slender. It may be regarded as the representative of *T. recurvatum* in the Gulf States. It is not found in Tennessee.

8. *T. DISCOLOR* Wray ex Hook. Bot. Mag. lviii, t 3097 (1831) has spatulate yellow petals, of which at least one is apiculate.

9. *T. STAMINEUM* Harbison, Biltm. Bot. Stud. i. 23 (1901) has a very pubescent stem, and pubescent veins on the lower surfaces of the leaves; petals which are much narrower than the sepals, and very large, broad, purple stamens, which are almost as large as the petals.

Neither of these *Trilliums* has been reported from Tennessee. According to Small the former is found in the Carolinas and in Georgia, while the latter grows in Georgia, Alabama and Mississippi.

10. *T. ERECTUM* L. Sp. Pl. i. 340 (1753). *T. rhomboideum* Michx., Fl. Bor.-Am. 215 (1803). *T. acuminatum* Raf. Med Bot. ii. 99 (1830). *T. nutans* Raf. l. c. *T. flavum* Raf. l. c. 100.

The common, ill-scented *Trillium* of northeastern United States, ranges southward in the Appalachians to Tennessee. It is rare in the southern part of its range where it is replaced by the white-petalled var. *album*. Mt. Pisgah, May 27, 1928, *Hesler*; Shady Valley, May 4, 1928, *Jennison*; Rockwood, *Galyon*, no. 455; rich woods, Harriman, *Kearney*, no. 172.

10 a. *T. ERECTUM*, var. *ALBUM* (Michx.) Pursh, Fl. Am. Sept. i. 245 (1814). *T. rhomboideum*, β. *album* Michx. Fl. Bor.-Am. 215 (1803).—Differs from *T. erectum* only in the color of the petals, which are white, or creamy in age, and in having no scent. Farther north light-colored plants of *T. erectum* have been reported, some of them true albinos, with all parts of the flower white or green. In the Great Smoky Mountains these plants have dark ovaries, although the petals are white. In certain localities they grow by thousands.—Glade below Indian Grave Flat, Gatlinburg, *Anderson & Jennison*, no. 861; Roaring Fork, Gatlinburg, *Anderson*, no. 813 (one specimen approaches *T. Vaseyi*); *LeConte*, Gatlinburg, *Galyon*, nos. 467, 484; Cades Cove Mountain, Blount County, *Anderson*, no. 889; woods, Hiwassee Valley, *Ruth*, no. 457; Knoxville, *Ruth*, no. 456.

11. *T. VASEYI* Harbison, Biltm. Bot. Stud. i. 24 (1901). This, the largest *Trillium* in America, is like a gigantic *T. erectum*, some stem 6 dm. high; leaves 2 dm. long; petals 8 cm. long, 5 cm. wide, crimson-

purple; filaments much longer than in *T. erectum*. 5–10 mm. long; anthers 9–15 mm. long. *T. Vaseyi*, forma *album* House, Muhlenbergia vi. 73 (1910) is the white-petalled form.—An endemic of the southern Appalachians, not common. Mt. LeConte, Gatlinburg, *Galyon*, no. 470; Gatlinburg, June 8, 1930, *Sharp*; low woods, Oliver Springs, *Anderson & Jennison*, no. 958; without locality, *Gattinger*.

12. *T. GRANDIFLORUM* (Michx.) Salisb. Parad. Lond. t. i (1806). *T. rhomboideum* γ. *grandiflorum* Michx. Fl. Bor.-Am. i. 216 (1803). The common, large-flowered, white *Trillium* of the northeastern States, very variable, but easily recognized by the slender filaments and petals ascending at the base. The leaves are usually contracted into a very short petiole; the extreme form has been described as a distinct variety, var. *lirioides* (Raf.) Victorin.¹

T. grandiflorum is restricted to the mountains in Tennessee. Lem-on's Gap, Cocke County, *Kearney*, no. 338; Thunderhead, *Galyon*, no. 453; Gatlinburg, *Anderson & Jennison*, no. 873, *Anderson*, no. 802; Cades Cove Mountain, Blount County, *Anderson & Hesler*, nos. 1219, 1220; Monroe County, head of Tellico River, Apr. 23, 1890, *Scribner*; rich bluffs on Emory River, Harriman, *Kearney*, no. 170; mountain sides, Sewanee, *Kirby-Smith*.

13. *T. CATESBAEI* Elliott, Sketch Bot. S. C. & Ga. 429 (1817). *T. stylosum* Nuttall, Genera N. Am. Pl. i. 239 (1818). *T. nervosum* Ell., l. c. *Delostylis cernuum* Raf. (based on *T. stylosum* Nuttall) Jour. de Physique lxxxix. 102 (1819). Constitutes the sub-genus *Delostylum* Raf. Med. Fl. ii. 102 (1830).

This beautiful species stands apart from all other *Trilliums* not only in that it has a distinct style, but that the anthers are large and curved, the filaments long and stout, and all segments of the perianth strongly revolute.

A native of the mountains of North Carolina, Georgia and Tennessee, usually found in dry, sandy soil. In Tennessee it is more common at altitudes from 1200 to 2500 feet. The presence of a station at Memphis is a most unusual situation, though it points to a relation with the coastal plain which is by no means uncommon. *T. nervosum* Ell. is a slender form.

This plant was illustrated by Catesby, and was included in *T. cernuum* by Linnaeus.

Cades Cove, *Anderson*, no. 1152; Cades Cove Mountain, *Anderson*, nos. 907, 915; Sunshine, (Kinzel Springs), *Andes*, no. 68; on ridge among pines, Kinzel Springs, *Anderson* 1248; Ducktown, *Kearney*, no. 102; Albrecht Grove (?), "4 miles from here" (Memphis), *Egeling*.

14. *T. CERNUUM* L. Sp. Pl. 339 (1753). *T. latifolium* Raf., *T. hamosum* Raf., *T. medium* Raf., *T. glaucum* Raf., Med. Fl. ii. 101

¹ Victorin, Fr. Marie, Contr. Lab. Bot. Univ. Montreal xiv. 30 (1929).

(1830).—Similar to *T. Catesbaci* in that the flower is produced below the leaves on a curved pedicel, differing from it in having shorter, straight stamens, no style, and shorter petals which are not strongly recurved. The leaves are usually rhombic.

The typical form of this plant has lanceolate, acute petals. It grows from Newfoundland down the Atlantic coast to Georgia. Inland it is represented by *T. cernuum* var. *macranthum* Eames & Wiegand¹ which is a more robust plant with obovate petals rounded at the tips. This stout plant is very much like *T. Rugelii* Rendle.² The descriptions do not match as to color; the anthers and ovaries of *T. Rugelii* are described as deep purple. This character is more like that of *T. erectum* var. *album*, but Rendle's excellent plate is very much like some specimens of *T. cernuum* var. *macranthum* in the Gray Herbarium. The only specimen seen from a Tennessee station is of var. *macranthum*.

Ducktown, May, *Gattinger*.

15. *T. GLEASONI* Fernald, RHODORA xxxiv. 21 (1932). *T. declinatum* (Gray) Gleason Bull. Torr. Bot. Cl. xxxiii. 389 (1906), not Raf. *T. erectum*, var. *declinatum* Gray, Man., ed. 5, 523 (1867).—This plant has a straight, declined petiole, not a curved one, the flower below the leaves; filaments short, about 2 mm. long. In Tennessee, according to Eames & Wiegand.³

16. *T. UNDULATUM* Willd. Ges. Naturf. Fr. Neue Schr. iii. 422 (1801). *T. erythrocarpum* Michx. Fl. Bor.-Am. i. 216 (1803).—The well-known Painted Trillium of coniferous forests of northeastern North America, which is near its southern limits in the mountains of Tennessee. It only grows at relatively high altitudes in the southern Appalachians, where it is associated with the Fraser's fir-red spruce forest.—Rich mountain woods, Lemon's Gap, *Kearney*, no. 337; Wolf Creek, May 20, 1928, *Jennison*; Shady Valley, May 4, 1928, *Jennison*; Mt. LeConte, *Galyon*, no. 468; Mt. LeConte, 5000 ft. elev., *Anderson*, no. 1250; Ocoee Valley, May, 1859, *Gattinger*.

THE STATE UNIVERSITY OF IOWA,

Iowa City, Iowa.

LOBELIA DORTMANNA IN AROOSTOOK COUNTY, MAINE.—While on a botanical collecting trip in the northern part of Maine during the past summer I felt very fortunate in finding *Lobelia Dortmanna* Linné (Water Lobelia) growing in two localities. On August 20, 1933 I

¹ Eames & Wiegand, RHODORA xxv. 191 (1923).

² Rendle, Jour. of Bot. xxxix. 33 (1901).

³ RHODORA xxv. 150 (1923).

found the plant growing in considerable abundance in from two to three feet of water along the south-western margin of Madawaska Lake in Township xvi, Range 4. At this time some of the plants bore both flowers and fruits. On August 21, 1933 I also found this same plant growing under similar conditions in Eagle Lake, Township xvi, Range 6, near the mouth of Fish River. Specimens were collected at the former locality, and will be found in my collection under number 343. These stations are north of the previously recorded limits of the species in Maine.—MAYNARD W. QUIMBY, Ithaca, New York.

GAULTHERIA PROCUMBENS L., forma **accrescens**, f. nov. (TAB. 283), corolla persistenti accrescenti deinde 1 cm. longa roseata.—MASSACHUSETTS: oak and pine woods near the Hyannis pumping station, Barnstable, October 28, 1933, *M. L. Fernald, A. R. Hodgdon, C. B. Ummanzio*, et al., no. 2667 (TYPE in Gray Herb., isotype in herb. New England Botanical Club).

This extraordinary form of the common Checkerberry is the discovery of a group of students on the annual field-trip of "Botany 7" to Cape Cod. The excessive rains of the summer and autumn had so raised the levels of the usually productive ponds that they were quite without the typical display of beach plants. Consequently, the drowning of the bordering thicket and a driving nor'easter combined forced our party back into the ordinarily uninteresting mixed oak and pitch pine woods, to gather mushrooms for dinner. Some of the students, still further departing from the serious purpose of the trip, began gathering and eating Checkerberries, when one of them found a plant with the large accrescent pink corolla. Search brought to light about 20 fruiting stems, all apparently from one mat, showing this peculiarity. All other colonies in the neighborhood were quite typical, having lost the white corolla.

In typical *Gaultheria procumbens* the fruit, after the early loss of the corolla, becomes subglobose, with the closely appressed calyx-lobes tightly closed down over the summit of the capsule. In forma *accrescens*, due to the persistence and enlargement of the corolla, the fruit is campanulate, with the calyx-lobes straight and not arching. Through the kindness and interest of Professor J. F. Collins, who has made the photograph, and Dr. A. M. Waterman of the Providence Office of Forest Pathology, one of the flowers was frozen and sectioned but no sign of fungus infection was found.—M. L. FERNALD & A. R. HODGDON, Gray Herbarium.

THE ORIGIN OF THE NAME LESPEDEZA

P. L. RICKER

IN the year 1803, a work was published on the flora of North America as a result of the explorations in this country of André Michaux and his son François André-Michaux between 1785 and 1796.

In this work¹ was described a new genus of legume which was named *Lespedeza* and in a footnote it is given as named for "D. LESPEDEZ, gubernator Floridæ, erga me peregrinatorem officiosissimus," which may be translated as named for "D. LESPEDEZ, Governor of Florida, on account of the greatest courtesy to me during my travels." This has been interpreted by later writers as protection furnished by the Governor, but Michaux's Journal apparently disproves this. There were no local conflicts with the Indians at that time and, according to the Journal, all of his trips were by boat with frequent landings and accompanied by his son, a negro purchased at Charleston, and two hired boatmen who were also armed with guns, which are mentioned on only one occasion when a salute was exchanged on approaching a settlement. The courtesies extended, as far as mentioned, were entirely social, beginning with an invitation to dine with the Governor and ladies soon after his arrival.

In connection with a study of the economic species of *Lespedeza* with Dr. A. J. Pieters of the U. S. Department of Agriculture, it seemed desirable to have a little more information regarding D. Lespedez and his relations with the elder Michaux. The Journal of the latter² indicates that he arrived at St. Augustine February 28, 1788, explored the immediate region to a distance of 50 to 100 miles radius, and left there May 27, 1788. In several places he refers to visits to or from "His Excellency the Governor," but in no place mentions him by name. The Governor took a great interest in his collections on the return from several trips, and visited him to see his material on at least one occasion.

It would seem probable that some of the early histories of Florida or of the Spanish possessions in this country would make some mention of the name of the Governor of Florida during that period, but a search of those available at the Library of Congress failed to reveal any

¹ Michaux, André. *Flora Boreali-Americana*, 2: 70. 1803.

² Published in the original French by C. S. Sargent, *Proc. Amer. Philos. Soc.* 26: 1-145. 1889.

such reference. A bibliography at the end of one of the histories did however state that numerous early manuscripts were in the library of the Florida State Historical Society at DeLand, and I am indebted to the Secretary, Mr. James A. Robertson of Takoma Park, Md., for the following information.

The Governor of East Florida from 1784 to 1790 was Vicente Manuel de Céspedes,¹ who resided at St. Augustine. Their earliest document mentioning him is from Havana and dated March 3, 1784, when he was governor elect and had not taken his post. Photostat copies of other documents written by him, from the Archives in Seville, are also in the library of the above Society.²

The name *Lespedeza* was evidently so printed through an error of the printer, of Michaux's son or of L. C. M. Richard of the Paris Museum who is generally credited with having done most of the botanical work on the collections of Michaux. This was possibly due to illegibility of some of Michaux's notes as the ship on which he returned to France was wrecked off the coast of Holland, but most of his collections and notes were recovered from the water.

It would be exceedingly unfortunate and confusing after over one hundred years' use of the name *Lespedeza* if a correction in spelling were made. Botanical rules do not require it.

Confusion would also be caused on account of the name *Cespedesia* of the Family *Ochnaceae* described by Goudot in 1844,³ and named for Juan Maria Céspedes, professor of botany at Santa Fé de Bogotá.

Under the international botanical rules two generic names even if of similar origin but of a single letter difference in spelling, when it does not involve the gender of the terminating letter or letters, are valid.

It is however hoped that no over-enthusiastic botanist will seize upon this case as an opportunity to make a new name or correction sufficiently different in appearance to think he is entitled to place his name after all of the new combinations involved. This has unfortunately been done in one or two cases in recent years but such a practice

¹ In the old spelling the letter c was z.

² Later Dr. John Hendley Barnhart has called my attention to a short biographical note on Gov. Céspedes in Brevard, Caroline M. A history of Florida from the treaty of 1763 to our own times. Published by the Florida State Historical Society. 1924.

³ Ann. Sci. Nat. III. 2: 368. 1844.

is not ethical, and is not warranted under any written or unwritten rules of botany.¹

BUREAU OF PLANT INDUSTRY,
Washington, D. C.

HAWAIIAN MOSSES.² Mr. Bartram has rendered a notable service to bryologists in collecting into one compact octavo volume the hitherto widely scattered, and frequently almost inaccessible, information on the Hawaiian mosses. His descriptions are written from a study of authentic, often type, material and are models for completeness and detailed information. The manual describes 198 species and 26 varieties, of which 195 species are illustrated by excellent text figures by the author, although Mr. Bartram modestly refrains from stating this fact. Like the descriptions these figures are made from authentic, often type, material. In the case of more or less cosmopolitan species both text and figures have been drawn, except in a few instances, from specimens collected in Hawaii. Thus the manual becomes, in a sense, a volume of original descriptions and drawings of all known Hawaiian mosses.

The arrangement of families and genera follows closely that of Engler and Prantl: "Die natürlichen Pflanzenfamilien," edition of 1924-1925. The nomenclature is that adopted for mosses at the Cambridge International Congress of 1930, making Hedwig's "Species Muscorum" (1801) as the starting point. Abundant keys to genera and species help make a very workable manual for the amateur or professional bryologist. As might be expected in the case of isolated tropical islands, with mountains reaching 6000 feet altitude, there are many endemic species—said to be more than 50 per cent.

Twenty species and varieties are described as new. These are: *Fissidens hawaiiicus*, *F. insularis*, *Dicranella hawaiiica* var. *tomentella*, *D. rigidula*, *Holomitrium squarriifolium*, *Leucobryum gracile* var. *hamatum*, *Calymperes hawaiiense*, *Encalypta scabrata*, *Anoetangium haleakalea* var. *laxum*, *Trichostomum oblongifolium*, *Leptodontium brevicaulis*, *Weberia gracilescens*, *Bryum vino-viride*, *Daltonia pseudostenophylla*, *Fabronia degeneri*, *Thuidium plicatum* var. *brevifolium*, *Glossadelphus irroratus*, *G. acutifolius*, *Ectropothecium viridifolium*, *Isopterygium vineale*.—J. F. C.

Volume 36, no. 423, including pages 61-100 and plates 278-280 was issued 9 March, 1934.

¹ Under the International Rules, as amended in 1930, a new name which is so similar to an older one as to cause confusion is not allowed.—Eds.

² Manual of Hawaiian Mosses, by Edwin B. Bartram. Bulletin 101, Bernice P. Bishop Museum, Honolulu, Hawaii. June, 1933, pages 1-275, figures 1-195.



FIG. 1, *PRIMULA HUNNEWELLII*, $\times 1$; FIG. 2, fruit, $\times 3$.

FIG. 3, *P. SPECUICOLA*, fruit, $\times 3$.



GAULTHERIA PROCUMBENS, forma ACCRESCENS, $\times 1$.

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